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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,842	11/12/2003	Paul S. Andry	YOR920010100US2 (8728-493)	6927
22150	7590	08/03/2005	EXAMINER	
F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797			HON, SOW FUN	
			ART UNIT	PAPER NUMBER
			1772	

DATE MAILED: 08/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/706,842

Applicant(s)

ANDRY ET AL.

Examiner

Sow-Fun Hon

Art Unit

1772

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/13/05 has been entered.

***Response to Amendment***

***Withdrawn Rejections***

2. The 35 U.S.C. 102(b) and 103(a) rejections have been withdrawn due to Applicant's amendment dated 04/13/05.

***New Rejections***

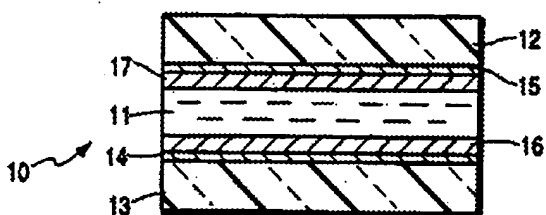
***Claim Rejections - 35 USC § 102***

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 15, 17, 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaganowicz (US 5,011,268).

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Regarding claim 15, Kaganowicz has a liquid crystal display device, comprising: an alignment layer (abstract) and liquid crystal material 11 in contact with alignment layer 16 (column 3, lines 10-20).



Kaganowicz teaches that the material for the alignment layer includes silicon nitride which is disclosed to have a chemical formula of  $\text{SiN}_x\text{H}_y$ , wherein when  $x = 1.2$ ,  $y = 0.5$ , the material has all the properties needed for an effective alignment layer (column 3, lines 45-55) and required pretilt angle (column 3, lines 25-30). Therefore Kaganowicz teaches that the amount of silane is introduced (column 3, lines 44-55) to adjust the stoichiometric ratio of the constituent materials in order to obtain the chemical formula of  $\text{SiN}_x\text{H}_y$ , wherein the stoichiometric ratio of  $x = 1.2$ ,  $y = 0.5$  provides the given pretilt angle.

Regarding claim 17, Kaganowicz teaches that the material includes  $\text{SiO}_y\text{N}_z$  (silicon oxynitride) (column 3, lines 60-70).

Regarding claim 19, Kaganowicz teaches that the material includes  $\text{SiO}_x$  (silicon oxide) (column 4, lines 45-55), which provides a homeotropic alignment layer, as evidenced by Applicant's specification (page 10, lines 5-10). Kaganowicz teaches that the material provides a tilt angle (column 3, lines 15-20), which means that the homeotropic alignment layer is tilted.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

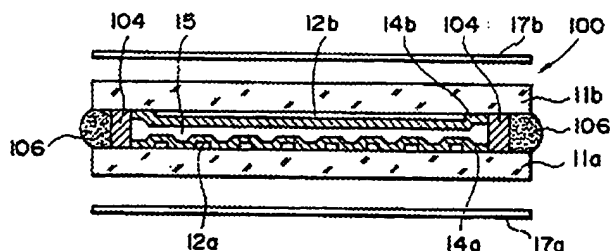
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 16, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaganowicz as applied to claims 15, 17 above, and further in view of Onuma et al. (US 5,353,141) and Applicant's admission.

Kaganowicz teaches a liquid crystal display device, comprising: an alignment layer comprising constituent materials, the constituent materials having a stoichiometric ratio adjusted to provide a given pretilt angle; and liquid crystal material in contact with the alignment layer, as described above.

Regarding claim 16, Kaganowicz fails to teach that the material includes  $\text{SiC}_x$  wherein x is adjusted to provide the stoichiometric relationship.

Onuma has a liquid crystal display device (column 1, lines 10-15), wherein liquid crystal 15 (column 6, lines 45-50) is in contact with alignment layer 14a/b (column 6, lines 55-60).



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Onuma teaches that  $\text{SiC}_x$  (silicon carbide) can be used in place of silicon nitride (column 7, lines 1-5) to form an inorganic alignment film (column 7, lines 15-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used silicon carbide in place of silicon nitride as the material for forming the alignment layer of Kaganowicz, as taught by Onuma, in order to obtain an alternate alignment layer with the properties provided by silicon carbide.

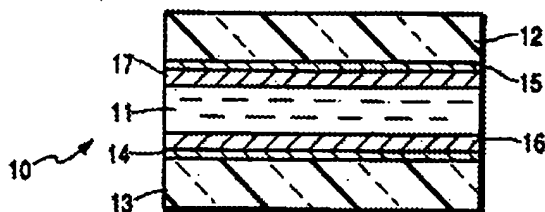
Regarding claim 18, Kaganowicz fails to teach that the material includes a material having Pi-electrons.

Onuma teaches silicon carbide material (column 7, lines 1-5), which has Pi-electrons, as disclosed or admitted by Applicant, in Applicant's specification (page 11, lines 5-15). Onuma teaches that  $\text{SiC}_x$  (silicon carbide) can be used in place of silicon nitride (column 7, lines 1-5) to form an inorganic alignment film (column 7, lines 15-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used silicon carbide in place of silicon nitride as the material for forming the alignment layer of Kaganowicz, as taught by Onuma, in order to obtain an alternate alignment layer with the properties provided by silicon carbide which has Pi-electrons, as disclosed or admitted by Applicant.

7. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaganowicz in view of Chaudhari et al. (US 6,195, 146).

Kaganowicz has a liquid crystal display device, comprising: an alignment layer formed on a substrate (electrode, abstract) and liquid crystal material 11 in contact with alignment layer 16 (column 3, lines 10-20).



Kaganowicz teaches that the material for the alignment layer includes silicon nitride which is disclosed to have a chemical formula of  $\text{SiN}_x\text{H}_y$ , wherein when  $x = 1.2$ ,  $y = 0.5$ , the material has all the properties needed for an effective alignment layer (column 3, lines 45-55) and required pretilt angle (column 3, lines 25-30). Therefore Kaganowicz teaches that the amount of silane is introduced (column 3, lines 44-55) to adjust the stoichiometric ratio of the constituent materials in order to obtain the chemical formula of  $\text{SiN}_x\text{H}_y$ , wherein the stoichiometric ratio of  $x = 1.2$ ,  $y = 0.5$  provides the given pretilt angle.

Kaganowicz fails to teach that the alignment layer is ion beam-irradiated.

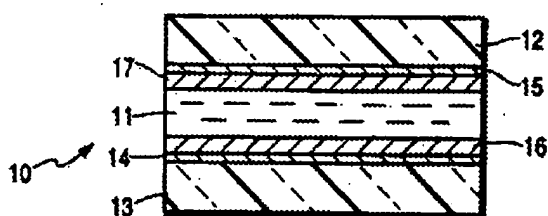
Chaudhari teaches ion-beam (abstract) irradiation (exposure) on the surface of the alignment layer to adjust the pretilt angle (column 2, lines 15-25), and hence to control the uniformity of the pretilt angle. Chaudhari teaches that the irradiation method of alignment is a non-rubbing method which circumvents the problems posed by the rubbing method (column 2, lines 10-15), such as difficulty in achieving stability and uniformity (consistency) of the pretilt angle (column 1, lines 55-60).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the ion-beam irradiation method of Chaudhari to adjust the pretilt angle of the alignment layer of Kaganowicz, in order to ensure stability and uniformity of the pretilt angle.

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8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaganowicz in view of Fayet et al. (WO 99/19229).

Kaganowicz has a liquid crystal display device, comprising: an alignment layer formed on a substrate (electrode, abstract) and liquid crystal material 11 in contact with alignment layer 16 (column 3, lines 10-20).



Kaganowicz teaches that the material for the alignment layer includes silicon nitride which is disclosed to have a chemical formula of  $\text{SiN}_x\text{H}_y$ , wherein when  $x = 1.2$ ,  $y = 0.5$ , the material has all the properties needed for an effective alignment layer (column 3, lines 45-55) and required pretilt angle (column 3, lines 25-30). Therefore Kaganowicz teaches that the amount of silane is introduced (column 3, lines 44-55) to adjust the stoichiometric ratio of the constituent materials in order to obtain the chemical formula of  $\text{SiN}_x\text{H}_y$ , wherein the stoichiometric ratio of  $x = 1.2$ ,  $y = 0.5$  provides the given pretilt angle.

Kaganowicz teaches that the material for the alignment layer includes  $\text{SiO}_x$  (silicon oxide) wherein  $x=2$  ( $\text{SiO}_2$ , column 4, lines 30-35), but fails to teach that the alignment layer has a preexisting pretilt angle to which an amount of material is added to adjust the stoichiometric ratio of the constituent materials of the alignment layer, in order to provide a given pretilt angle which is different than the preexisting pretilt angle.



Fayet teaches that by regulating the quantity of oxygen in the gas mixture it is possible to control the chemical reaction so that the thus-formed silicon oxide can have a formula  $\text{SiO}_x\text{C}_y$ , wherein  $x$  is adjusted to be within the range of 1.5-2.2 due to the introduction of carbon (column 6, lines 9-15). Hence Fayet teaches that the introduction of carbon material allows the regulation of the quantity of oxygen in the gas mixture in order to adjust the stoichiometry of the oxygen in the silicon oxide layer wherein  $x$  can vary from 2.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have provided an amount of material for adjusting the stoichiometric ratio of the constituent materials of the alignment layer of Kaganowicz, as taught by Fayet, in order to obtain a given stoichiometric ratio which provides a given pretilt angle different than the preexisting pretilt angle of the alignment layer of Kaganowicz.

### ***Response to Arguments***

9. Applicant's arguments with respect to claims 15-20 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached on (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*S. Hon.*  
Sow-Fun Hon

07/25/05

*Harold Pyon*  
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SUPERVISORY PATENT EXAMINER  
1772

7/25/05